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REL: TOPOGRAPHY OF REDMOND AREA.

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On January 7, 1938, I made a field examination of the area on Sevier river between the highway bridge crossing the same west of Salina, and the Gunnison Fayette dam northwest of Redmond with the thought in mind of determining the scope of and the time required for making a topographic survey of the river bottoms.

The length of the river bottom area from Salina bridge to the West View dam is approximately five miles and has an approximate average width of two miles, or having an area of 10 square miles. The length of the river bottom from West View dam to the Gunnison Fayette dam is approximately 6 miles. The area that should be covered by topographic survey is approximately two miles in average width comprising an area of 12 square miles. The following recommendations are made with respect to making a topographic survey of this area.

A horizontal control by transit survey should be established for the entire length of the area from Gunnison Fayette dam to the bridge west of Salina followed by a vertical control survey made by wye level referred to sea level which may be taken from U. S. C. & G. S. B. Ms. now established along the highway through and adjacent to this area. The transit control should be one continuous traverse for the entire length of the area. The ends of the courses in this traverse should be so situated as to be ganerally visible over the river bottom area. This latter is essential for plane table work in connection with the topography. Points on each side of the traverse near the outside lateral boundaries of the river bottom area should first be selected so as to form approximately equalateral triangles and flagged and angles read to the same for triangulation purposes at the time the points on the transit traverse are occupied. These additional signal points can then be occupied and the angles at the same read and the whole accurately platted on the plane table sheetsfor control purposes. Care should be taken to obtain checks on the accuracy of the transit control so as to avoid errors in horizontal position of the finished topographic map. The angles to signals or flags should be repeated so as to form a check on the work and make possible the computation of a triangulation net to be plotted as the control for topography. At the time the transit traverse is made, ties to existing land corners, should be made in order to plat the land lines on the topographic map. The sea level elevation should be taken from an established U. S. C. & G. S. B. M. at beginning of the work and closed on

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a similar B. M. at the end of the work so as to form a closed circuit without being required to run a level loop. All B. Ms. established, as well as transit points, should be flagged for identification by the topographic party. The line of B.M. should follow approximately up the center of the river bottom area in order to be most available to the plane table man in making the topographic survey. It is recommended that the survey be made on a scale of 400 ft. to the inch, and that the contour interval be one foot. The contour crossings on the water surface in the river should be accuratly shown, and wherever possible, depths to the bottom of the river should be noted on the map. Water surface above and below all dams, should be clearly shown. Where water surface elevations are taken, they should be recorded on the plane table sheet to feet and hundredths referred to sea level.

It is estimated that the control survey will require under favorable weather conditions one month to complete, whereas, under unfavorable winter working conditions, it is estimated this will require two months time. A like amount of time will also be required for conducting the topographic survey. This is on the basis of one party working.

In running the level lines, it would be well to take observations of the water surface in the river where the points can be definitely described with respect to the horizontal control. Such water surfaces may be used advantageously in determining the hydraulic gradient of the river. The day and hour of the day should be recorded when water surface elevation observations are made, in order to correlate the same with fluctuations in the river stage at an observing gage. It is suggested that a staff gage be installed at the Sevier river bridge on the state highway north of Redmond and that this gage be read and recorded several times each day during the progress of the work so far as it pertains to elevations of water level at any points in the river.

The contours should be shown above the general river bottom on the easterly side of the same to approximately 15 to 20 ft. in elevation above the river, and on the west side at least to the height of the Rockyford canal or its possible extension at the same gradient now existing in the same.

A general examination of the conditions on Sevier river between the bridge west of Salina and the West View dam indicates that this portion of the river with the exception of a short distance above the West View dam, has ceased to be an area in which silt carried by the river deposits. Since the work of improving the river channel in this area during 1934, the river , except immediately above the West View dam, has been a scouring stream instead of one in which silt has deposited. Prior to 1934, this section of the river had been without a well defined channel, and consisted principally of overflow swamp land in which the sediment carried by the river was deposited. The silt now is carried beyond this district and naturally deposits in the sluggish river immediately below the West View dam.

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It appears that the Town of Redmond cannot be relieved of the water close to the surface by means of improving the river channel above the West View dam, for the reason that the existence of Redmond lake and drains leading therefrom, holds the water much higher in elevation than does the river in this district. The Rockyford canal has for years discharged large volumes of water through its wasteway into Redmond lake, and is there held at an elevation higher than the water in the river. In fact the water wastes from the lake into the river above the West View dam. It is, therefore, apparent that the ground water in the vicinity of the town of Redmond is supplied from Redmond lake, and the streams leading therefrom and into the same. The town of Redmond holds the water in Redmond lake at an elevation above the natural ground surface in the towm in order to operate a combined hydraulic power and pumping plant for supplying the town with water for municipal purposes. Since the Sevier river below West View dam has become silted up, it has clogged the tile drains in the vicinity of Redmond and has reduced, or cut off, the natural drainage from this area into the river. This silting of the river has been hastened by reason of the reduced flow of water in comparison to the capacity of the river channel in recent dry years, particularly since the year 1934, when all of the silt contribution from the river above and from Salina creek and Denmark Wash passes below said dam as hereinbefore stated.

From personal observations of the river during past years as compared to my observations at this time, it appears that the water surface under the bridge north of Redmond is approximately normal, whereas, the channel has been almost filled with silt immediately below the West View dam. In order to relieve the ground water conditions in and about Redmond, it appears necessary to lower the water surface in the river below the West View dam by removing the silt and possibly shortening the channel, and thus increasing the gradient and mean velocity of the river. By making a channel change of approximately 500 ft. in length, the river length will be reduced in one instance northeast of Redmond, approximately one mile.

If conditions in the river channel adjacent to Redmond, are improved to the extent that the deposit of silt is eliminated, the silting of the river will then be transferred to the back water in the river above the Gunnison Fayette canal, and likewise if the conditions at the latter place are improved so as to eliminate the silting, the deposit will be transferred down stream to the back water from the Dover dam. It appears to me that to eliminate as far as possible the menace from the overflow, or raising of the ground water table near the above mentioned dams, it will be necessary to provide means for lowering the water surface in the river and thus increasing the hydraulic gradient by placing outlets in said dams sufficiently low in elevation so as to accomplish the necessary gradient increases in the river. These outlets would permit of draft from the bottom of the stream and lowering of the water surface in the river above the dams when water is not being diverted. Diversions at each of the three dams above mentioned are necessary in order that the various canals may receive the water to which they are entitled, which water is yielded in part by an increasing river for its entire length through this district. It thus becomes impracticable to make a higher diversion to supply these canals with the purpose of lowering the water in the river through this district.

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